

## Executive Summary

### D5.1 Review of policy requirements and financing instruments

This report has been prepared as part of work package 5 (WP5) of the FIThydro project, in specific Task 5.1 which aims at investigating the regulatory landscape influencing actions relevant to environmental improvements in the context of planning and operating hydropower plants. Emphasis is given to the requirements of the EU Water Framework Directive (WFD), nature protection policies and policies on renewable energy and climate change adaptation, thereby outlining opportunities, barriers and challenges in reaching multiple environmental objectives.

In addition to reviewing the regulatory landscape, this report also looks at the use of financing instruments especially in the countries where FIThydro test sites are located. These instruments are considered essential in providing the necessary support to promote and sustain ecologically compatible hydropower production.

#### European policies

Several EU policies set ecological/environmental requirements on hydropower plants. Examples are EU policy requirements for environmental impact assessment as well as nature protection requirements of the Habitats Directive. Additionally, the further use and development of hydropower should consider the environmental objectives of the WFD, which aims at the achievement of good ecological status (GES) in European waters. Especially the hydromorphology and fish fauna of water stretches affected by hydropower are adversely impacted. In order to reconcile climate protection, water protection and nature protection objectives, hydropower should be generated in such a manner as to maintain the ecological functions of the affected water stretches.

#### National legislation

The review of national policies concentrated on eight European countries in the four regions (Scandinavia, Alpine, Iberian peninsula and France/Belgium) where FIThydro test sites are located. These eight countries are also characterised by an important hydropower sector within these four regions. The review of national legislation focused on legislation which is relevant to ecological improvements in water ecosystems (with repercussions in hydropower production) to renewable energy production.

Important recent amendments to the key legislation have been highlighted because of their relevance to the operation of existing HPP or the authorisation of new HPP.

#### Strategic planning instruments

The majority of the reviewed countries have strategic planning instruments in place for new hydropower use and development. These strategic planning instruments are developed mostly for the national and regional level. They are part of or related to other planning processes, especially hydropower sector planning (AT, CH, DE, FR, NO), national renewable energy action plans (ES, FR, NO) or river basin management planning (NO, AT, FR, ES).

The kind of strategic planning instruments identified include the formulation of legal requirements on where development of hydropower is allowed or not, national/regional master plans or strategies to guide hydropower development, decision support systems to guide decision-making (e.g. criteria catalogues for hydropower development) as well as studies on the potential for hydropower.



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Although these strategic planning instruments are not related to simplification of authorisation processes for HPP, they can give a signal to operators about hydropower projects which are more likely to be rejected or accepted in the authorisation procedure (at specific sites).

In addition, most countries also have strategic planning instruments for restoring continuity. These take the form of lists of water courses where it is necessary to ensure migration of fish and sediment transport (FR), national strategies for river restoration (ES), prioritisation of the revision of hydropower concessions with restoration of continuity as a key measure considered (NO), connectivity studies and strategies delineating migratory routes (DE).

## Environmental requirements in the context of authorising hydropower plants

Prior to the strengthening of environmental legislation in the second half of the 20th century, many countries offered unlimited concessions (AT, DE, SE) or particularly long concessions to HPP (up to 99 years in ES). However, based on recent changes in environmental legislation and social pressure, permit duration for HPP has been in general reduced. Still, there remains a large number of unlimited permits on old HPP (e.g. in SE, up to 90% of hydropower concessions active today) which are complex to revise due to the administrative difficulty of doing so.

Criteria defining the duration of permits usually include the size of HPP, the specific situation especially in terms of hydrology, flow and associated water uses (e.g. water supply) and whether the HPP was built before or after the passing of recent legislation which changed conditions for permit duration.

Time-limited concessions are longer for large HPP (e.g. 50-90 years) and shorter for small HPP (e.g. 15-35 years). The duration of concessions aims at recovering costs of the investment.

Furthermore, in most of the reviewed countries (NO, AT, DE, FR, ES, PT), the duration of concessions generally differs between new and existing HPP, usually due to the changing of legislation in recent decades. In specific, the WFD and revisions of national policy related to the WFD have been strong drivers for modifying authorisation procedures for new HPP as well as for revising permits of existing hydropower. According to this review, authorisations for existing hydropower are being adapted or are expected to be adapted to meet the requirements of the WFD in most of the eight countries examined.

In case the permit of an operating HPP runs out, in all reviewed countries, the same conditions as for new authorisations apply in the process of permit renewal (except for SE where permits are indefinite). This means that mitigation measures may be required for existing HPP, even where none were required before.

### *Mitigation measure requirements for HPP*

The type of mitigation measures required for new and existing HPP have been reviewed, focusing on the following key domains of environmental improvements at HPP: upstream/downstream fish migration, flow conditions, hydropeaking, gravel transport, habitat enhancement, as well as fish stocking provisions. The report distinguishes between mitigation requirements which are based on legislation, requirements which are based on a recommendation (e.g. a guideline or technical standard), requirements which are defined in individual cases or situations where there is no requirement in place for a certain type of mitigation.

Requirements for mitigation of the impacts of disrupted upstream fish migration and modified flow conditions are the ones most commonly based on legislation.

In some countries, there is a lack of relevant requirements for mitigation related to gravel/sediment transport, hydropeaking impacts and downstream fish migration, mainly due to still open



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questions which need clarification through further research or pilot studies. For these type of impacts and for similar reasons, several countries follow a case-by-case approach when defining mitigation requirements.

In general, mitigation requirements for new and for existing HPP do not differ substantially, if there is an option to revise existing permits. In case permits run out and need to be renewed, similar requirements as for new HPP are usually applied.

Cost proportionality and balancing is also taken into account during authorization procedures, as well as the needs of other water uses such as flood protection, recreation, tourism, landscape and heritage aspects, etc.

Some degree of monitoring of mitigation measures, which have been set within HPP authorisations, is required across all countries reviewed. Effects of measures on fish migration, such as fish passes, appear to be the most commonly monitored (e.g. in AT, CH, DE, PT, SE, and NO).

## Financing instruments

In order to support the implementation of multiple environmental objectives (especially renewable energy production and protection of water ecosystems), financing and support instruments for hydropower development should be linked to ecological criteria for the protection of the water environment.

Results from the eight reviewed countries indicate that the instruments primarily being used in most countries are financial support schemes for the modernisation of existing plants (AT, CH, DE, ES, NO), followed by feed-in tariffs (CH, DE, ES, FR) and green power labels (AT, CH, DE, SE).

Compensation options to reduce energy production losses due to mitigation measures or monetary compensation are not widely applied.

In one of the countries reviewed (Portugal), there is at present no financial or other type of instrument aiming at boosting the hydropower sector, independently or cumulatively with the improvement of the status of water bodies.

## Challenges and opportunities for hydropower planning and operation

The present review has identified a number of challenges as well as opportunities related either to the legislation and regime of authorisations or the financing tools for environmentally-friendly hydropower.

In general, challenges are related to uncertainties of the interpretation of the legal framework (e.g. of the WFD requirements for the objectives of heavily modified water bodies) or lack of specification of a time-frame for implementing mitigation in existing HPP.

In some countries (e.g. FR, SE), there are ongoing reviews (or have been until recently) of the legislative framework and/or permit regime, which create uncertainty for the sector but also opportunities for new developments with appropriate mitigation of impacts.

The adequate financing to support necessary mitigation measures at hydropower stations still is a major bottleneck, despite several examples of innovative support schemes that have been in place.

For the full deliverable, please click [here](#)



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